WHAT IS CLAIMED IS:

1. Substantially pure DNA expressing the Beta subunit of human thyroid stimulating hormone.

2. DNA of claim 1, comprising nucleotide sequence: ATG ACT GCT CTC TTT CTG ATG TCC ATG CTT TTT GGC CTT GCA TGT GGG CAA GCG ATG TCT TTT TGT ATT CCA ACT GAG TAT ACA ATG CAC ATC GAA AGG AGA GAG TGT GCT TAT TGC CTA ACC ATC AAC ACC ACC ATC TGT GCT GGA TAT TGT ATG ACA CGG followed by a sequence of about 400-450 nucleotides, and ending with the sequence: GAT ATC AAT GGC AAA CTG TTT CTT CCC AAA TAT GCT CTG TCC CAG GAT GTT TGC ACA TAT AGA GAC TTC ATC TAC AGG ACT GTA GAA ATA CCA GGA TGC CCA CTC CAT GTT GCT CCC TAT TTT TCC TAT CCT GTT GCT TTA AGC TGT AAG TGT GGC AAG TGC AAT ACT GAC TAT AGT GAC TGC ATA CAT GAA GCC ATC AAG ACA AAC TAC TGT ACC AAA CCT CAG AAG TCT TAT CTG GTA GGA TTT TCT GTC TAA.

3. DNA of claim 1, comprising nucleotide sequence: ATG ACT GCT CTC TTT CTG ATG TCC ATG CTT TTT GGC CTT GCA TGT GGG CAA GCG ATG TCT TTT TGT ATT CCA ACT GAG TAT ACA ATG CAC ATC GAA AGG AGA GAG TGT GCT TAT TGC CTA ACC ATC AAC ACC ACC ATC TGT GCT GGA TAT TGT ATG ACA CGG.

4. DNA of claim 1, comprising nucleotide sequence: GAT ATC AAT GGC AAA CTG TTT CTT CCC AAA TAT GCT CTG TCC CAG GAT GTT TGC ACA TAT AGA GAC TTC ATC TAC AGG ACT GTA GAA ATA CCA GGA TGC CCA CTC CAT GTT GCT CCC TAT TTT TCC TAT CCT GTT GCT TTA AGC TGT AAG TGT GGC AAG TGC AAT ACT GAC TAT AGT GAC TGC ATA CAT GAA GCC ATC AAG ACA AAC TAC TGT ACC AAA CCT CAG AAG TCT TAT CTG GTA GGA TTT TCT GTC TAA.

5. Genetically engineered plasmids comprising DNA expressing human thyroid stimulating hormone beta subunits.

6. Plasmids of claim 5, wherein said plasmids comprise pBR322.

7. Plasmids of claim 5, wherein said plasmids are useful in transforming prokaryotic cells.

8. Genetically engineered vectors useful in transforming eukaryotic cells wherein said vectors comprise DNA expressing hTSH-β subunits.

9. Transformed cells which express human thyroid stimulating hormone beta subunits.

10. Cells of claim 9, wherein said cells are prokaryotic cells.

11. Cells of claim 10, wherein said cells are E. coli.

12. Cells of claim 11, wherein said E. coli cells are E. coli strain HB101.

13. Cells of claim 12, wherein said HB101 cells are transformed with plasmid pBR322 containing DNA expressing human thyroid stimulating hormone beta chains.

14. Cells of claim 9, comprising eukaryotic cells.

15. Thyroid stimulating hormone beta chains produced by the cells of claim 9.

16. A method of determining the cause of thyroid gland failure comprising administering to a patient human thyroid stimulating hormone prepared by recombinant DNA technology and observing whether or not administration of said thyroid stimulating hormone results in a change in the activity of said patient's thyroid gland, change indicating

that said thyroid failure results from central pituitary or hypothalamic disease, and no change indicating primary thyroid failure.

17. Substantially pure human thyroid stimulating hormone comprising genetically engineered beta subunits.

18. Substantially pure human thyroid stimulating hormone comprising beta subunits produced by the plasmids of Claim 5.

19. Substantially pure human thyroid stimulating hormone comprising beta subunits produced by the vectors of Claim 8.